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| EXAMINER | |
|---|---|
| BOYKIN, TERRESSA M | |
| ART UNIT | PAPER NUMBER |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/580,172 | NADKARNI ET AL. | |
| | Examiner | Art Unit | |
| | Terressa M. Boykin | 1796 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5-22-6*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

**Priority**

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

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**Abstract**

Applicant is reminded of the proper language and format of an Abstract of the Disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. The printer will no longer accept Abstracts that are more than 25 lines, regardless of the number of words. The form and legal phraseology often used in patent claims, such as "means" and "said", should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

***the recited "terphthalate" in claim 1 line 1 is misspelled.***

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

**Claims 1- 26, 28 are rejected under 35 U.S.C. 102( b) as being anticipated by USP 5167889 cols. 1- 6 and claim 1.**

Applicants are claiming in claims 1-6 a polyethylene terephthalate-containing polymer formed by polymerizing a mixture comprising (a) terephthalic acid or an ester equivalent thereof, (b) a glycol, (c) an aliphatic dicarboxylic acid or an ester equivalent thereof, and

(d) a hydroxy terminated polyether polyol, wherein the mixture comprises: (1) a molar ratio of the glycol and the terephthalic acid of 1 to 3.5 (2) 2 to 10 weight percent of the aliphatic dicarboxylic acid based on the weight of the polymer; (3) the hydroxy terminated polyether polyol in an amount such that the hydroxy terminated polyether polyol is equivalent to 1 to 5 weight percent in the polymer; (4) the aliphatic or alicyclic diol in an amount such that the aliphatic or alicyclic diol is equivalent to 1 to 5 weight percent in the

polymer.

With regard to claims 1-6 note **USP 5167899** discloses a melt-blowing process for producing a fiber of an extrudable polyurethane having a large amount of hard segment, which comprises supplying a polyurethane comprising the reaction product of:

(a) an organic polyisocyanate;

(b) an isocyanate-reactive material having an average functionality of at least 1.9, a glass transition temperature (Tg) of less than 20.degree.C., and a molecular weight in the range of 500 to 20,000; and

(c) at least one chain extender having a functionality from 2 to 3 and a molecular weight from 50 to 400;

which reaction product has up to 25 percent by weight of soft segment derived from the organic polyisocyanate (a) and the isocyanate-reactive material (b) and at least 75 percent by weight of hard segment derived from the organic polyisocyanate (a) and the chain extender (c), in a molten form from at least one orifice of a nozzle into a gas stream supplied to an area adjacent to the orifice which attenuates the molten polymer into fibers. Such micro fibers are particularly useful in the field of high temperature filtration, coalescing and insulation.

Therefore, it is desirable to provide a micro fiber and a nonwoven mat, fabric, web, or similar structure prepared from a polymer which is easily melt-blown or spun into micro fibers exhibiting good chemical resistance excellent toughness and good dimensional stability.

It was unexpectedly found that a rigid, extrudable polyurethane having a specific amount of hard segments have excellent micro fiber-forming properties such as low viscosity, high melt strength and good melt elasticity when depolymerized at melt temperatures. The depolymerized polyurethane can be readily prepolymerized to provide rigid polyurethane having sufficient molecular weight and desired physical and chemical properties such as toughness, chemical resistance and dimensional stability.

The isocyanate-reactive materials (b) employed in the preparation of the polyurethanes used in the present invention can be any of those previously known in the art and employed in the preparation of polyurethanes which materials contain active hydrogen groups and which also meet the criteria set forth above, namely, have a functionality of at least 1.9, a glass transition temperature (Tg) of less than 20.degree. C., and a molecular weight in the range of 500 to 20,000. The materials (b) having these properties or the soft segment derived therefrom can provide thermoplastic characters of the resulting polyurethanes.

Examples of the isocyanate-reactive materials (b) are polyether polyols, polyester polyols, amine -terminated polyethers, hydroxy-terminated polycarbonates, hydroxy-terminated polybutadienes, hydroxy-terminated poly-butadiene-acrylonitrile copolymers, amino-terminated polybutadiene-acrylonitrile copolymers, hydroxy-terminated copolymers of dialkyl siloxane and alkylene oxides such as ethylene oxide, propylene oxide and the like, provided that all of said compounds also meet the criteria of Tg, molecular weight and functionality listed above. Preferably the molecular weights of the materials are within the range of 1,250 to 10,000, and most preferably, in the range of 2,000 to 8,000. The functionality of these materials is advantageously not greater than 6 and preferably, in the range of 2 to 4. Examples of these isocyanate-reactive materials are described more fully in U.S. Pat. No. 4,376,814.

Suitable chain extender (c) which can be used in the present invention include aliphatic straight and branched chain diols, including cycloaliphatic diols, preferably having from 2 to 8 carbon atoms, inclusive, in the chain. Examples of such diols are ethylene glycol, 1,3-propanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 1,2-propanediol, 1,3-butanediol, 2,3-butanediol, 1,3-pentanediol, 1,2-hexanediol, 3-methylpentane-1,5-diol, 1,4-cyclohexanediamethanol, and the like including mixtures of two or more such diols. The extenders, which can be used alone or in admixture with each other or any of the above diols, also include diethylene glycol, dipropylene glycol, tripropylene glycol, ethanolamine, N-methyldiethanol-amine, N-ethyl-diethanolamine, and the like, as well as ester diols obtained by esterifying adipic, azelaic, glutaric and like aliphatic dicarboxylic acids with aliphatic diols such as those exemplified above utilizing from 0.01 to 0.08 mole of acid per mole of diol. Also included in the extenders used in the present invention are the adducts obtained by an aliphatic diol or triol such as 1,4-cyclohexanedimethanol, neopentyl glycol, hexane-1,2--diol, ethylene glycol, butane-1,4-diol, tri--methylolpropane and the like with epsilon-caprolactone in a mole ratio of from 0.01 to 2 moles of caprolactone per mole of diol or triol.

As set forth above, the proportion of the organic polyisocyanate (a), isocyanate-reactive material (b) and the chain extender (c) are such that the reaction product of components (a), (b) and (c) has up to 25 percent by weight, preferably from 0 to about 20 percent by weight, more preferably from 0 to about 10 percent by weight, of soft segment derived from the organic polyisocyanate (a) and the isocyanate-reactive material (c); and at least 75 percent by weight, preferably at least 80 to 98 percent by weight, most preferably at least 90 percent by weight, of hard segment derived from the organic polyisocyanate (a) and the chain extender (c). The use of the ranges outside of the above will result in poor properties in toughness, chemical resistance or dimensional stability. The overall ratio of isocyanate groups to active hydrogen groups in the reactants employed to prepare the polyurethane is preferably in the range of 0.95:1 to 1.05:1.

Highly desirable polyurethanes which can be employed in the present invention suitably have a viscosity ranging from 50 to 1500 poise, more suitably from 100 to 1,000 poise, most suitably from 200 to 500 poise as measured at processing, e.g., extrusion

temperature. Preferably the weight average molecular weight of the polyurethane ranges from 50,000 to 750,000, more preferably from 80,000 to 500,000, most preferably from 100 to 300,000 as determined by high temperature size exclusion chromatography. To obtain uniform melt-blown products of better uniformity, a polymer having narrow molecular weight distribution (Mw/Mn) may be selected. The molecular weight distribution of the polyurethane is preferably within the range of from 1.8 to 8.0, more preferably from 2.0 to 5.0, most preferably from 2.5 to 3.5.

A preferred temperature range is from about 200.degree. to 280.degree. C., more preferably from 220.degree. to 260.degree. C., most preferably from 230.degree. to 250.degree. C.

In accordance with the present invention, the tensile strength of nonwoven mats is increased by fuse-bonding the nonwoven mat by exposing the same to temperatures greater than 270.degree. C., optionally while compressing the mat *sufficiently to prevent shrinkage of the fibers* in the mat.

The nonwoven mats of the present invention are particularly useful in high temperature filtration of corrosive media such as flue gas (i.e., as bag house filters to remove particulates), acids and hydraulic oil, as coalescing media, and in other applications requiring thermal and chemical stability. The nonwoven mats of the present invention have high insulating value, high cover per unit weight, and high surface area per unit weight. Due to high orientation of micro fibers in axial direction, randomization and proper thermal bonding the nonwoven mats also have high strength per unit weight. The nonwoven mats may also be compacted and used as battery separators. The nonwoven mats can also be used in any field where nonwoven mats of conventional construction have been used. Examples include uses as reinforcing liners for linoleum, gasketing, etc.

Micro fibers or nonwoven mats of melt-blown micro fibers were prepared in accordance with a process as shown in FIG. 1 except that excess molten polymer was withdrawn from a molten polymer supplying line, 4, to an overflow container. A 3/4" (1.9 cm) extruder (L/D=20; compression ratio=1:3) was used. A spinpack was employed having a nozzle with one orifice surrounded by a circular gas slot, 11, as shown in FIG. 2 wherein the inner diameter of the orifice, A, was 0.0533 cm (0.0210 inches); the outer diameter of the orifice, B, was 0.0826 cm (0.0325 inches); and the diameter of the circular gas slot, C, was 0.1656 cm (0.0652 inches). A distance between the orifice and the collecting device 8 was 3.25 cm. The time required for a polymer to pass through the equipment from the feeding hopper on the extruder to the collecting device below the spinpack was 15 minutes.

A rigid polyurethane (ISOPLAST.TM. 301 commercially available from The Dow Chemical Company; polyurethane prepared from 4,4'-methylene diphenyldiisocyanate, 1,6-hexane diol, and cyclohexanediol and polytetramethylene glycol) having a weight

average molecular weight (Mw) of 300,000 and a molecular weight distribution (Mw/Mn) of 2.5 to 3.0 was added to the extruder hopper and melted. The melt-blowing process was carried out using the process conditions as indicated in Table 1.

The average diameter, molecular weight and molecular weight distribution of micro fibers in the nonwoven mats obtained are as shown in Table 1.

The reference discloses a prepared from the same components as claimed by applicants. Any properties or characteristics inherent in the prior art, e.g. dye index, although unobserved or detected by the reference, would still anticipate the claimed invention. Note In re Swinehart, 169 USPQ 226. "It is elementary that the mere recitation of a newly discovered...property, inherently possessed by things in the prior art, does not cause claim drawn to those things to distinguish over the prior art". Since the disclosed parameters are expressed differently and thus may be distinct from those claimed, it is incumbent upon applicant(s) to establish that they are in fact different and whether such difference is unobvious. In view of the above, there appears to be no significant difference between the reference and that which is claimed by applicant(s). Any differences not specifically mentioned appear to be conventional. Consequently, the claimed invention cannot be deemed as novel and accordingly is unpatentable.

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior

art are such that the subject matter as a whole would have been obvious at

the time the invention was made to a person having ordinary skill in the art

to which said subject matter pertains. Patentability shall not be negatived

by the manner in which the invention was made.

**Claims 1- 26, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

**USP 5167899 see abstract, cols. claims.**

Specifically, the method discloses a melt-blowing process for producing a fiber of a polyurethane having a large amount of hard segment, which comprises supplying an extrudable polyurethane comprising the reaction product of:

(a) an organic polyisocyanate;

(b) an isocyanate-reactive material having an average functionality of at least 1.9, a glass transition temperature (Tg) of less than 20.degree. C., and a molecular weight in the range of 500 to 20,000; and

(c) at least one chain extender having a functionality from 2 to 3 and a molecular weight from 50 to 400;

which reaction product has up to 25 percent by weight of soft segment derived from the organic polyisocyanate (a) and the isocyanate-reactive material (b) and at least 75 percent by weight of hard segment derived from the organic polyisocyanate (a) and the chain extender (c), in a molten form from at least one orifice of a nozzle into a gas stream supplied to an area adjacent to the orifice which attenuates the molten polymer into fibers.
. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ particular amounts and/or parameters as known in the art, since it is well-established that merely selecting proportions and ranges is not patentable absent a showing of criticality. In re Becket, 33 U.S.P.Q. 33 (C.C.P.A. 1937). In re Russell, 439 F.2d 1228, 169 U.S.P.Q. 426 (C.C.P.A. 1971).

With regard to claims **7, 8, 9, or 10** discloses a filament wherein said filament is dyed with dispersed dye without dye carrier to have a dye index greater than 100; or wherein said dye index of said dyed filament is at least about 120-600; or wherein a controlled shrinkage of said filament is 6 to 10%. Any properties or characteristics inherent in the prior art, e.g. dye index, although unobserved or detected by the reference, would still anticipate the claimed invention

With regard to claim **11, 12, 13, 14, 15, 20, 21, 22, 23, 24** wherein a yarn comprising said filaments as claimed in claim 7, wherein said yarn is POY or FDY; or wherein said yarn is optionally textures to obtain DTY or FTTY; or wherein said yarn is dyed with a dispersed dye without dye carrier at 100.degree. C. to have a dye index greater than 100; or wherein said dye index of said dyed yarn is at least about 120-600; or wherein said yarn has a controlled shrinkage of 6 to 10%; A yarn comprising staple fibers as claimed in claim 16; or wherein said yarn is dyed with a dispersed dye without dye carrier at 100.degree. C. to have a dye index greater than 100; wherein said dye index of said dyed yarn is at least about 120-600; wherein said yarn has a controlled shrinkage of 6 to 10%; wherein said yarn is used to produce woven or knitted fabric. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ particular amounts and/or parameters as known in the art, since it is well-established that merely selecting proportions and ranges is not patentable absent a showing of criticality. In re Becket, 33 U.S.P.Q. 33 (C.C.P.A. 1937). In re Russell, 439 F.2d 1228, 169 U.S.P.Q. 426 (C.C.P.A. 1971).

With regard to claim **16,17,18, or 19** for a staple fiber wherein said staple fiber is dyed with a dispersed dye without dye carrier at 100.degree. C. to have a dye index greater than 100; or wherein said dye index of said dyed yarn is at least about 120-600; or wherein said yarn has a controlled shrinkage of 6 to 10%. Any properties or characteristics inherent in the prior art, e.g. dye index, although unobserved or detected by the reference, would still anticipate the claimed invention

With regard to claim **25** for a woven or knitted fabric comprising yarn as claimed in claim 11.

With regard to claim **26** wherein said fabric is dyed with disperse dye without carrier to have a dye index greater than 100 and 6 to 10% controlled shrinkage. Any properties or characteristics inherent in the prior art, e.g. dye index, although unobserved or detected by the reference, would still anticipate the claimed invention

With regard to claim **28** wherein the glycol and the terephthalic acid or the ester equivalent thereof is in a molar ratio of 1 to 3.5, further wherein the mixture comprises 2 to 10 weight percent the aliphatic dicarboxylic acid based on the weight of the polymer and 1 to 5 weight % of the hydroxyl terminated polyether polyol based on the weight of the polymer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ particular amounts and/or parameters as known in the art, since it is well-established that merely selecting proportions and ranges is not patentable absent a showing of criticality. In re Becket, 33 U.S.P.Q. 33 (C.C.P.A. 1937). In re Russell, 439 F.2d 1228, 169 U.S.P.Q. 426 (C.C.P.A. 1971).

Each of the references discloses a polyethylene terephthalate prepared from the

same components as claimed by applicants wherein a fabric may be a woven from the resulting micro fibers except for the particular amounts and parameters, i.e. weight percents as claimed . As noted above, Any properties or characteristics inherent in the prior art, e.g. dye index, although unobserved or detected by the reference, would still anticipate the claimed invention ". Since the disclosed parameters are expressed differently and thus may be distinct from those claimed, it is incumbent upon applicant(s) to establish that they are in fact different and whether such difference is unobvious.

With regard to the amounts or weight percents as noted above, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ particular amounts and/or parameters as known in the art, since it is well-established that merely selecting proportions and ranges is not patentable absent a showing of criticality. In re Becket, 33 U.S.P.Q. 33 (C.C.P.A. 1937). In re Russell, 439 F.2d 1228, 169 U.S.P.Q. 426 (C.C.P.A. 1971). Generally, it is prima facie obvious to determine workable or optimal values within a prior art disclosure through the application of routine experimentation. *See* In re Aller, 105 USPQ 233, 235 (CCPA 1955); In re Boesch, 205 USPQ 215 (CCPA 1980); and In re Peterson, 315 F.3d 1325 (CA Fed 2003). Consequently, the claimed invention cannot be deemed as unobvious and accordingly is unpatentable.

**It is noted that claim 27 has been canceled.**

**Correspondence**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terressa M. Boykin whose telephone number is 571 272-1069. The examiner can normally be reached on Monday-Thursday 10-5:30 Friday (work at home).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Terressa M. Boykin/
Primary Examiner, Art Unit 1796